iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** VI **Month of publication:** June 2017

DOI:

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Cluster Based Routing Protocol for Channel Allocation in Heterogeneous Manet

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Abstract: ***Energy and bandwidth efficiency is most important in the MANET network. By using the coordinated protocol with infrastructure there is a lack in the channel allocation dynamically. A dynamic channel allocation method is described in which traffic types are assigned by reference to an acceptable carrier to interference ratio for that traffic type. The bandwidth efficiency is most important in the MANET for the packet transmission. For this we propose two mechanisms which are dynamic channel allocation algorithm and cooperative load balancing algorithm. The proposed system specifies efficient routing in Cluster based MANET using heterogeneous approaches. The load balancing technique is improved in the CH election since it act as a secondary coordinator. Bandwidth utilization is a major concern in MANET due to its high traffic loads with increasing number of users. Focusing on the bandwidth efficiency, the network is created in cluster basis with load balancing and channel allocation techniques. Heterogeneous network model is included for providing the mechanism in different environment which illustrates the resource utilization in dynamic topology.***
Key Words: Load balancing, CBRP protocol, Channel allocation

I. INTRODUCTION

A mobile ad-hoc network (MANET) is the infrastructure less network. The group of mobile devices is interconnected by wirelessly and continuously self-configuring infrastructure. The topology of the network was unpredictable. Mobile ad hoc networks (MANETs) are forming a temporary network dynamically. It does not use any existing infrastructure. It allows the topology of the network and interconnections between nodes to change rapidly.
MANET was used in many practical applications, such as personal area networks, and military applications.

II. RELATED WORK

In the multi hop wireless network, the CSMA method used to enable the similar radio resources to be allocated in different b locations; it leads to increased bandwidth efficiency due to hidden terminal problems. Various reservation technique can be used to over the hidden terminal problem. Before the packet transmission, RTS/CTS packet exchange mechanism used to overcome the hidden terminal problem. The modifications of RTS/CTS mechanism has to be proposed to increase the bandwidth efficiency.
In coordinated MAC protocol, the channel controllers perform the channel assignment with channel reuse concept .the concept of cellular network used to access the channel through the base station, which has the fixed infrastructure. There are two type of channel allocation used in cellular system that are centralized and distributed allocation scheme. In centralized dynamic channel allocation method, the central coordinator can assign the available channels to the various cells. This type of systems having the high overhead so it cannot be suitable to MANETs .Distributed allocation, each cell in the network is assigned a number of channels, the channel are exchanged between the adjacent cells. This method cannot be directly applied to the MANET.

III. EXISTING SYSTEM

MANET has to be grown as essential in the developing applications. The energy and bandwidth efficiency are needed for transmission efficiently. The MAC protocol uses the bandwidth utilization efficiently with coordinated and uncoordinated protocols. In multi –hop wireless networks, CSMA techniques enable the same resources to be used in different locations which lead to the increased bandwidth efficiency due to hidden terminal problem. The bandwidth efficiency is the most important in the MANET for the packet transmission.so here two mechanisms are used dynamic channel allocation and load balancing algorithms.

A. Dynamic channel allocation algorithm:

In dynamic channel allocation algorithm, the channel controllers are reacting to increasing the network load by increasing their

Volume 5 Issue VI, June 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

sharing of bandwidth. In this algorithm the cluster head continuously monitor the power level in the all available channels in the network. If the load was increases, the cluster head uses the additional channel to support the non-uniform network load, it increases the interference in the system. It also leads to the low latency links with an efficient communication with all nodes of the network.

B. Cooperative Load balancing algorithm

In this algorithm, the loads on the cluster head start from the requirement of the ordinary nodes. Many nodes in a network have the capability access to more than one channel coordinator. The basic premise of the cooperative load balancing algorithm is that the active nodes can continuously monitor the load of the channel coordinator and the load interchanged between the heavily loaded to the ones with available resources.

The nodes can the capability to detect the channel depletion at the administrator and transfer their load to other cluster head with more available resources. The node can release the available resource with capability to shift, can be used for other nodes that do not have access to any other cluster heads. The total number of nodes that access the channel was increased. It also increases the service rate and the throughput of the system. In this existing system, focused on bandwidth utilization and channel handover is not implemented. And leave the full adaptation of the system for delay sensitive communication as future work

1) Disadvantages

a) Communication delay is occurred

b) Resources are used only for the existing assigned users

c) Less reliability in packet transmission

IV. PROPOSED SYSTEM

The proposed system implement a new network model by integrating the cluster based MANET with heterogeneous topology. The proposed system specifies efficient routing in Cluster based MANET using heterogeneous network. It uses an efficient routing protocol known as CBRP (Cluster Based Routing Protocol) which is used to divide the nodes into clusters. Intra-cluster routes (routes within a cluster) are discovered dynamically using the membership information. Routing in CBRP is based on source routing including the allocation of channel for each Cluster Head and Cluster Member. The control channel within each cluster is selected from the set of common idle channels.This protocol also maintains the cluster since the network topology is changed dynamically due to the nodes' mobility in the network

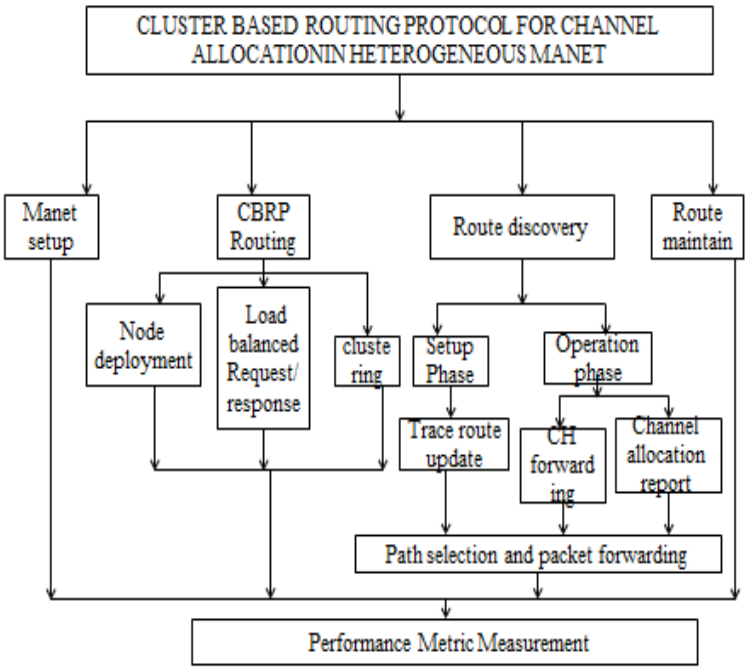

Fig: 4.1. system architecture

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ISSN: 2321-9653

A. Network formation

The network is created with number of mobile nodes according to MANET infrastructure. The communication is performed between the mobile nodes. For efficiency, the clusters are formed in the network with the mobile nodes. Channel allocation is performed for the efficient communication between the clusters.

B. Form the cluster and elect cluster head

The clusters are formed based on the range of the system. Here the range was assigned as 1010*1010m.cluster head was elected by their residual energy. Initially each node having the some energy, due to their mobility the energy was reduced. The CDCA protocol comprised the load balancing and dynamic channel allocation algorithm.

C. Heterogeneous Network

The network is created with the Base station to perform efficient channel allocation and routing of packets. The route is established with the help of control packets such RREQ and RREP. The source and the destination communication are performed with the Cluster head and base station.

D. CBRP Implementation

The communication is performed between the cluster head by the cluster based routing process. Each node maintains the routing table where in the information about the routes is stored. The format of this table is defines as RTABLE. When the source node wants to send a message to the destination node and does not already have a valid route to that destination, it initiates a path discovery process to locate the destination. The routing table is created due to the address of cluster heads. When determining the route, source routing is used for actual packet transmission from source to destination. When next hop is unreachable then it sends Route Error Message (ERR).

E. Performance analysis

The performance of the proposed system is compared with the existing system. The analysis is processed for the metrics such as Throughput, end-end delay, and Packet delivery ratio, Routing overhead. Also the network lifetime of the system is increased.

H. Flow diagram

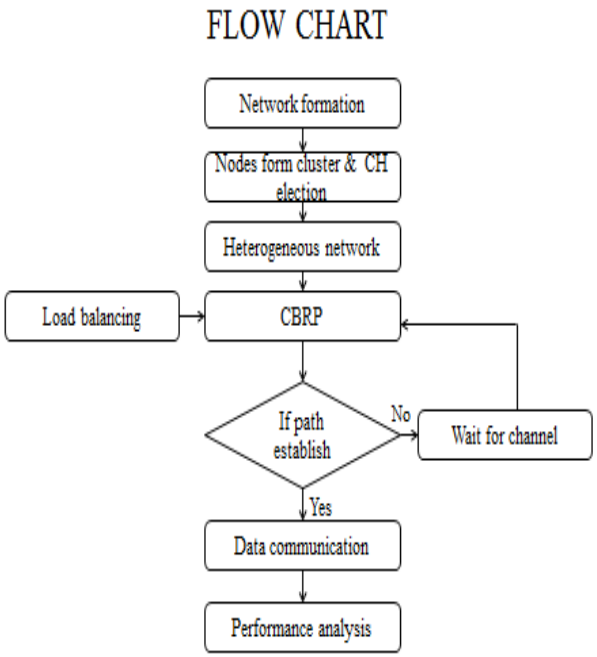

Fig: 4.2. Flow diagram of the system

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ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

V. RESULTS

In this section, analyze and compare the perfomance of proposed system with existing system.

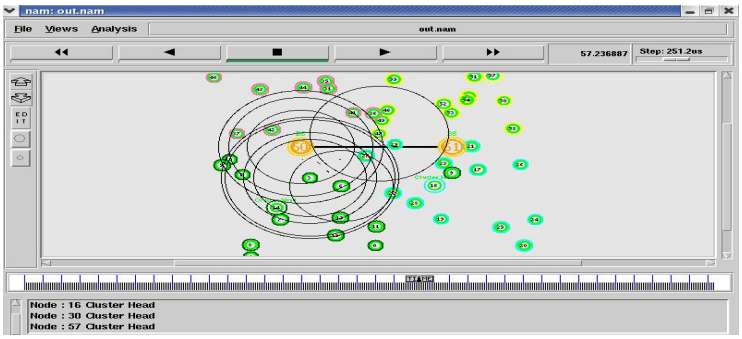

Fig: 5.1 Data transfer in the heterogeneous network

A. *Packet Delivery Ratio*

Packet delivery ratio (PDR) is calculated by dividing the no of packets received by destination to the no of packets transmitted by the source

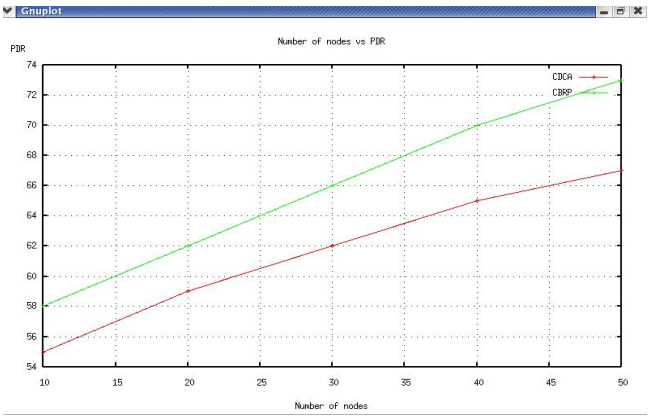

Fig: 5.2. PDR vs. Nodes

B. *Throughput*

It defined as the packets received by the receiver within the given amount of time period. In the graph throughput was increases with increment in number of demand.

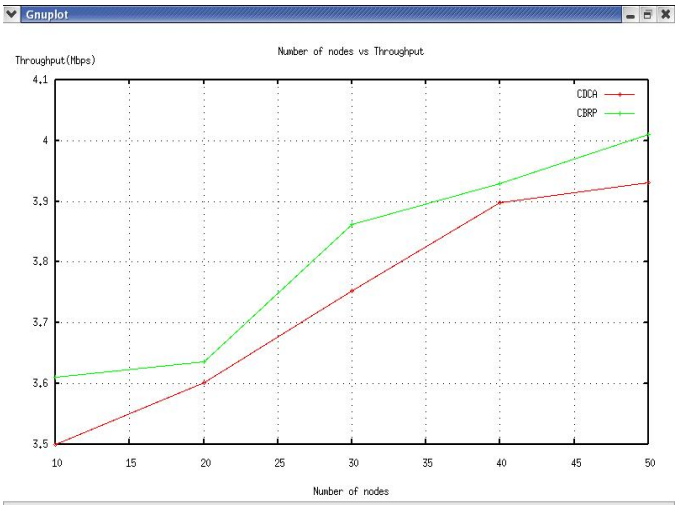

Fig: 5.6. Throughput vs. nodes

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ISSN: 2321-9653
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C. End to End delay

End –to-End delay of a packet is defined as the time taken by the packets travel from source to the destination.

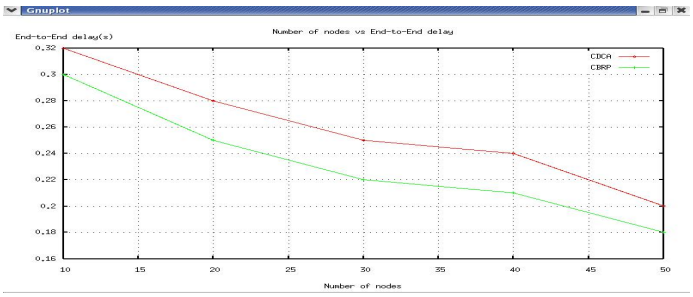

Fig: 5.7. End to end delay vs. nodes

D. Routing overhead:

Both routing and data packets have to share the same network bandwidth most of the times.

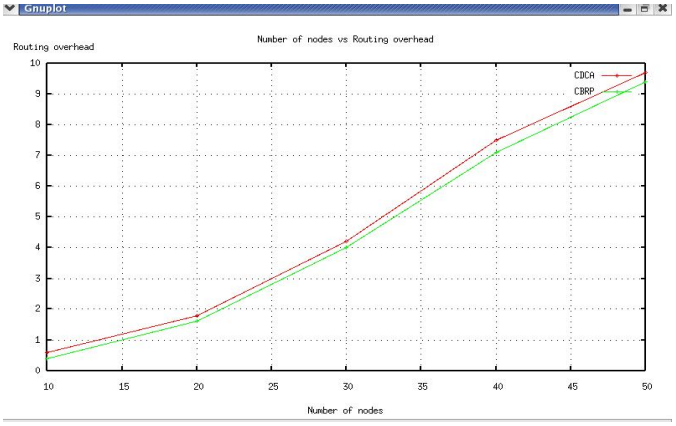

Fig: 5.8. Routing overhead vs. nodes

E. Network Lifetime

Fig 5.8 shows that lifetime of the network protocols. Finally it concludes CBRP better lifetime of the nodes.

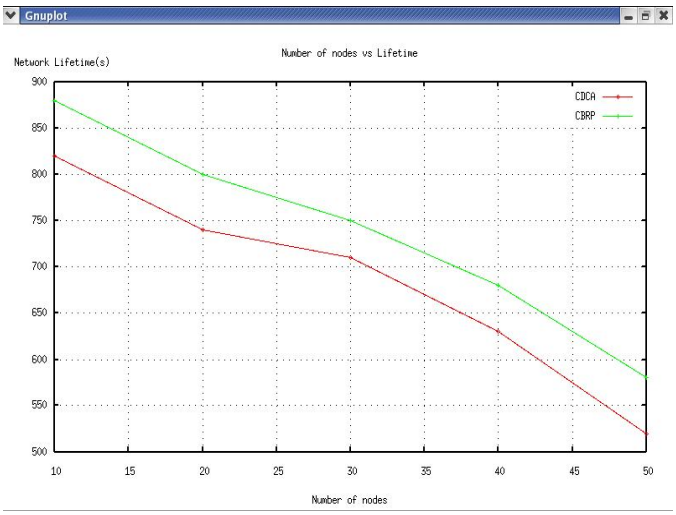

Fig: 5.8. Lifetime vs. nodes

VI. CONCLUSION

In this project, the proposed system used the heterogeneous deployment in cluster based MANET. In this algorithm, the channel

controllers continuously watch the power level in all the available channels in the network and access the availability of the channels by comparing the measured power levels. If the load on the channel controller increases above the capacity, the channel coordinator starts using an additional channel with the lowest power level measurement. Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Each device must forward the traffic information unrelated to its own use. The primary challenge of the MANET is to continuously maintain the information required to properly route traffic in each devices. In this project, an efficient routing protocol is proposed for improving the performance strategies in cluster based MANET. The channel is assigned dynamically by knowing the next-hop neighbors of CH. Load balancing and channel allocation are performed in this heterogeneous environment. The results show increased performance in terms of its parameters.

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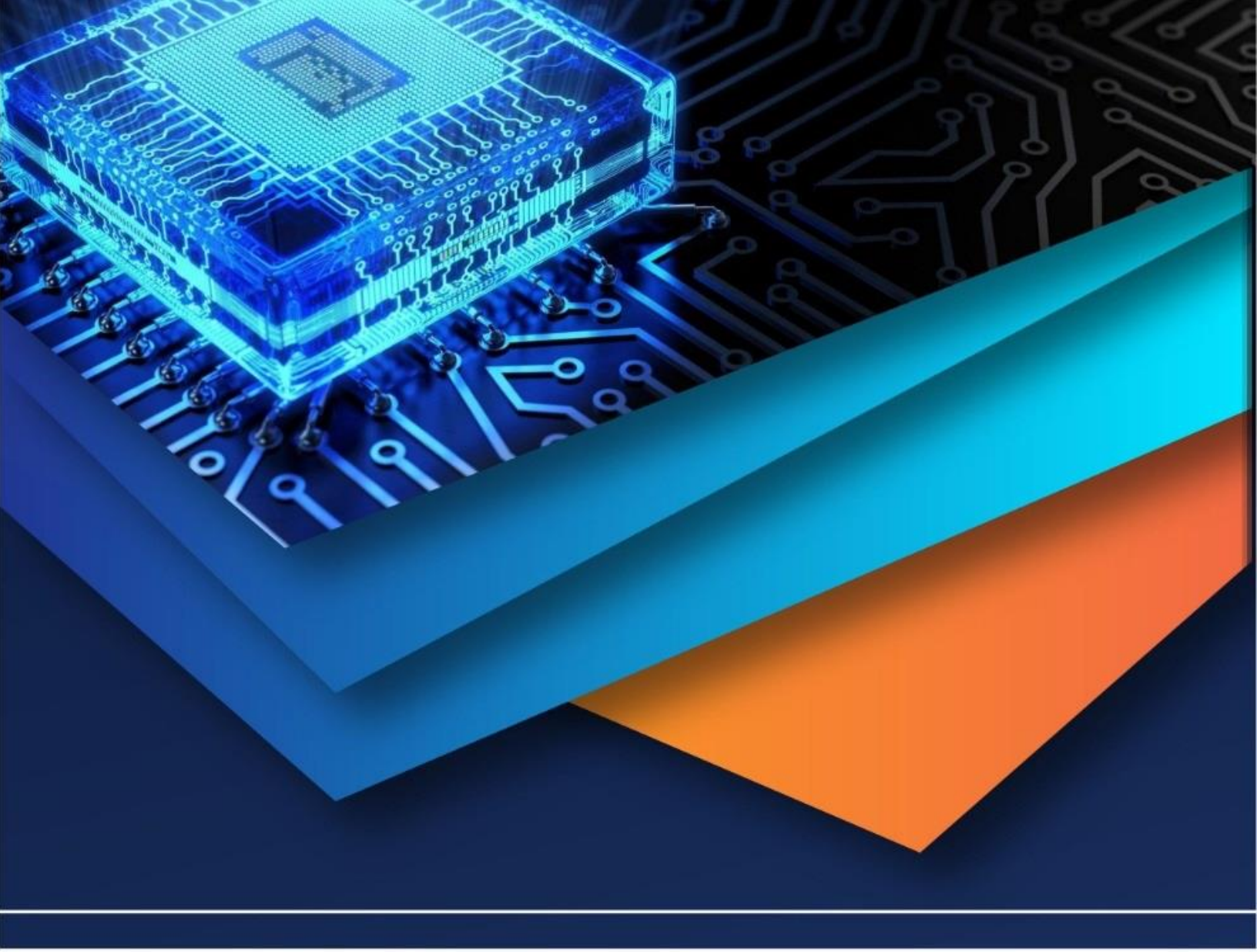

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